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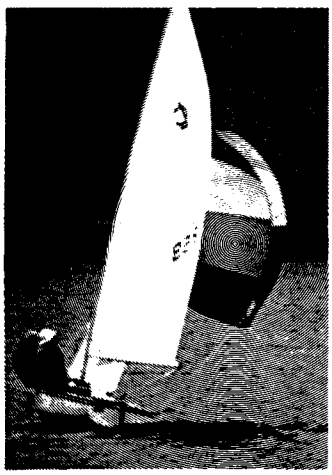

ENVIRONMENTAL LABORATORY

RECNOTES
NATURAL RESOURCES RESEARCH PROGRAM

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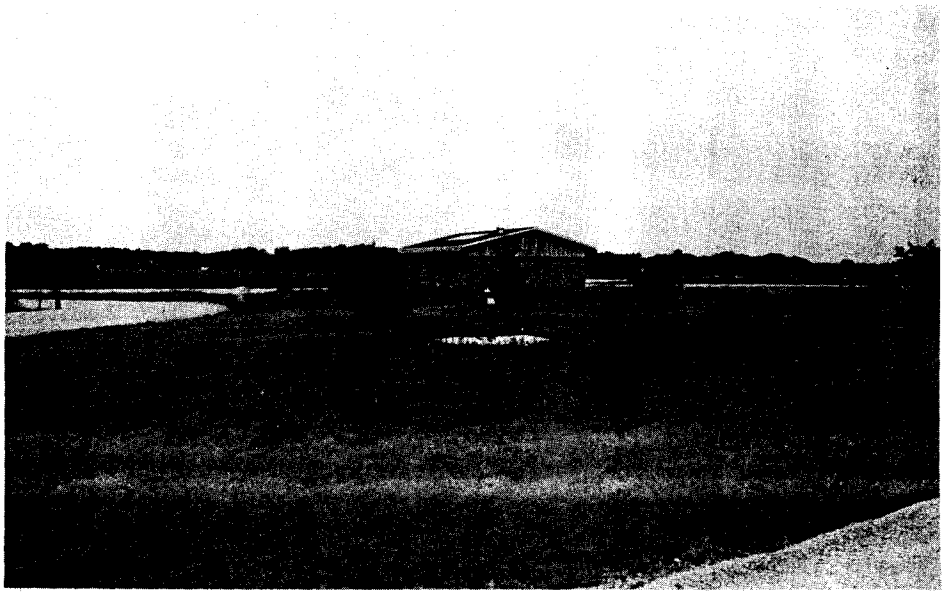


Prairie Flower North Campground with planned prairie environment

Low-Maintenance Prairie Restoration Demonstration at Saylorville Lake

Scott Rolfes
US Army Engineer District, Rock Island

Robert L. Lazor, H. Randolph Smith, and Hollis H. Allen
US Army Engineer Waterways Experiment Station

A low-maintenance turf and ground cover demonstration was initiated at a newly constructed group campground at Saylorville Lake. Saylorville Lake, located in central Iowa near Des Moines, is a flood-control and recreation facility in the Rock Island District. The project lies in the heart of the nation's original tall grass prairie zone. Today less than 1 percent of the state's original 30 million acres of prairie remain. The rich prairie soils are now used for producing corn and soybeans. Tall grass species dominated Iowa for 5,000 years, yet many Iowans and visitors have never seen or experienced this lost heritage often referred to as "the sea of waving grass."

The 28-acre site, called Prairie Flower North Campground, was located on an old farmsite. Approximately 10 acres were still actively farmed for wildlife purposes, although no chemicals were allowed during the last growing season. Annual and perennial weeds dominated the remaining acreage. The campground, newly constructed in 1988, includes a planned restored prairie featuring tall grass species and wildflowers. A turf reflecting the low-

maintenance characteristics of the tall grass was also designed to create an aesthetically pleasing minimum-maintenance facility providing long-term substantial cost savings. The campground consists of 12 acres of turf and 14 acres of tall grass prairie. Included in this 14 acres of tall grass was a 30-foot perimeter of midlength grasses and forbs to soften the dramatic height differences between tall grass prairie and campground turf. This 30-foot perimeter is referred to as a transition zone. The campground has 112 campsites within 11 loops, accommodating from 4 to 18 camping parties in each loop. This design allows for a range of activities from small group and families to large club rendezvous. The goal of the design was to provide an aesthetically pleasing low-maintenance landscape capable of accommodating high-density use.

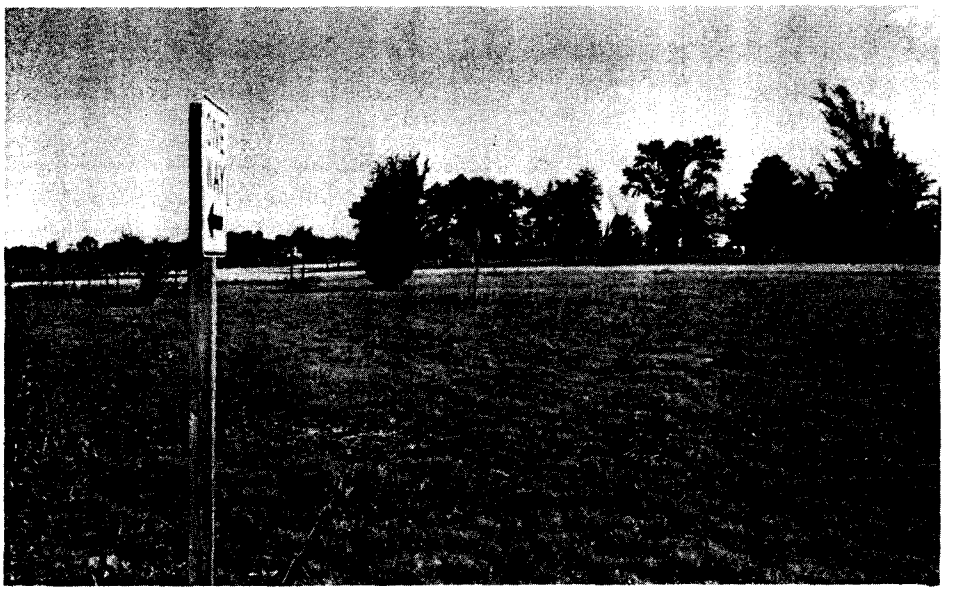
The restoration project consisted of three phases: planning, planting, and maintenance.

Planning

The planning phase was accomplished with the assistance of the "Field Guide for Low Maintenance Vegetation Establishment and Management" (Environmental Laboratory 1986). This document specifically deals with the planning, layout, and establishment of low-maintenance ground covers. A detailed soil analysis was performed to determine soil characterization. Thirteen 1-cup soil samples were randomly collected throughout the location. The samples were analyzed for grain size, soil texture type, and fertilizer requirements. Also measured were pH, phosphorus, potassium, calcium, magnesium, sodium, zinc, organic matter, and organic salts. This background information was important in formulating the planting plan and species selection. Planting maps were drawn which delineated low, medium, and tall prairie grass areas. To best typify the campground name Prairie Flower and to provide the unique experience of camping in a tall grass prairie, species selected were of common central Iowa prairie associations. Unfortunately grasses attaining 7-foot heights do not lend themselves to the turf needs of campgrounds. For that reason, a native warm-season grass was needed that met the criteria of being low growing and requiring minimum maintenance and yet still providing a usable turf.

Buffalo grass (*Buchloë dactyloides* (Nutt)) was selected because of its low-growing sod-forming capabilities. This species grows to a height of only 6 inches and spreads vegetatively creating a dense sod. This species was desirable as a selection for several other reasons. Minimum mowing requirements (after establishment) consist of a single mowing done in May to ensure uniform turf growth. Unlike most prairie species, buffalo grass is not overly sensitive to 2,4-D based broadleaf herbicides, permitting economical weed control. Once established, recommended chemical application is an annual spring application of simazine. Given the species' extensive north-south range throughout the Midwest, it was ideally suited for the turf needs of this particular project.

The tall grass species mix was designed from



Low-maintenance buffalo grass in 1988, one year after planting

plant inventories done on local prairie remnants located near the planting site that had similar soils and relief. The seed was secured from nearby producers to ensure survivability. Tall wildflower species were also selected to increase diversity and aesthetic quality.

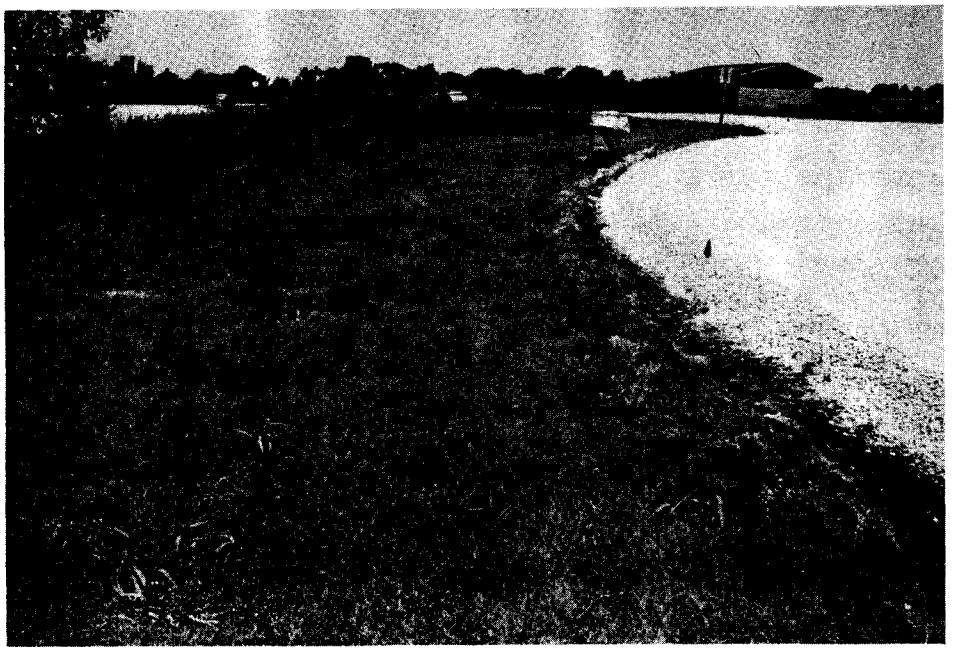
To soften the dramatic height differences between the buffalo grass turf and the tall grass restoration, a transition zone was planned which consisted of three prairie grass species--blue grama, sideoats grama, and little bluestem. These midlength grasses attain a height of 3 feet. Wildflowers were purchased to be heavily planted in this transition zone. Thirteen species were selected that were consistent with area remnants. Planting at 4 pounds per acre should assure strong blooming within this transition zone. By selecting local forbs in accordance with flowering time and length of bloom, attractive displays can be expected from May through September.

Planting

The next phase of the project was planting. Native tall grass restorations take approximately three years to fully establish and dominate. Seed bed preparation is critical and was accomplished in the following phases. In fall 1987, the area was burned to destroy weed seeds and reduce vegetative cover. Prairie grasses need firm seed beds to ensure germination so plowing and disking is ideally done the fall prior to planting. This allows for spring and early summer rains to naturally compact and firm the soil. Unfortunately wet conditions in the fall prevented turning the soil and this was delayed until the following April. To reduce the substantial weed competition present in the fallow fields, an application of 2 percent Roundup was applied when the area had developed a lush carpet of annual weeds in early May. A second application of Roundup was applied in late May approximately 10 days before planting.

To properly seed native tall grass species, a native grass planting drill is required. These special drills are designed to handle the fluffy nature of the seeds. Native grass drills are available for renting or borrowing from local conservation groups or State and Federal agencies. The tall grass species consisting predominately of big bluestem (*Andropogon gerardi*), Indian grass (*Sorghastrum nutans*), and little bluestem (*Andropogon scoparius*) were seeded at the recommended rate of 12-1/2 pounds per acre. The transition zone of midlength grasses was seeded at 7-1/2 pounds per acre with an additional mix of 4 pounds of wildflowers.

The buffalo grass was experimentally seeded at two rates--1/2 pound per 1,000 square feet and 1 pound per 1,000 square feet. This seeding was done with a power till seeder after experiencing calibration difficulties with the native drill seeder due to the asymmetrical shape of the seed burr of buffalo grass. Five days after planting, the



Drill-planted buffalo grass along campground roadways reduced mowing costs

12 acres of buffalo grass were treated with Princep (simazine) to provide additional weed control. The remainder of the restoration was not chemically treated due to the sensitivity of native species to chemicals.

The seeding was done the first week in June when soil temperatures had reached in excess of 60 degrees Fahrenheit at the 4-inch level. Warm-season species are best planted under these conditions and will germinate quickly provided adequate moisture is present. Planting before this time will only decrease germination potential as the seeds will lay there and become susceptible to rot. The buffalo grass germinated in 4 days, while the traditionally slower tall grasses germinated in 21 days.

Maintenance

During the first growing season, mowing once or twice is the only required maintenance on tall grass restorations. Mowing is done to prevent excess shading of developing grass seedlings. Mowing height is critical and should be done in the 8- to 12-inch range so as not to disturb the seedling development. Foxtail flourishes under disturbed soil conditions; however, it does not prove detrimental to native grasses and helps provide a fuel base for the following spring burn. Because of heavy broadleaf weed infestation, the tall grass restoration was mowed twice at 12 and 14 inches.

The buffalo grass turf was chemically controlled with the original application of Princep followed by a late season application of Trimec. The area was mowed three times for purposes of establishment, in addition to the chemical controls. The mowing height was 5 inches. The areas seeded at 1 pound per 1,000 square feet produced a full sod in a single growing season. The areas seeded at 1/2 pound per 1,000 square feet still showed planting rows but are expected to close to full cover in the next growing season.

To quantify reduced maintenance costs, a comparison was done with the adjacent Prairie Flower South Campground, which has a cool-season turf consisting of a monoculture stand of falcon fescue. A historical record of this fescue cultivar within this campground averages twelve mowings per year. Based on 1988 contract mowing data (at $24/acre mowing cost) annual mowing costs of 12 acres of campground would be $3,480. When comparing the same acreage of turf established in buffalo grass and mowed once annually in the spring (cost $298), the realized annual savings in mowing costs are projected at $3,182.

Long-term management of the campground tall grass prairie consists of two consecutive years of spring burning, followed by a three-year burn cycle. Fire is an important management tool in prairie management. These prairie species are well adapted to fire and wildfires keep the prairie free of trees. The buffalo grass turf needs annual application of Princep at the label rate in the spring. This discourages cool-season competition.

Results and Analysis

After a full growing season, the following conclusions have been drawn. Despite drought conditions in Iowa over the summer, tall species development was strongly evidenced by September. Sideoats grama was prevalent despite its low percentage in the restoration mix. This is common in central Iowa restorations, and it will lose its dominance after taller species become better established. Both seeding rates of buffalo grass were successful; however, the 1 pound of seed per 1,000 square feet produces a full sod in a single season. Once established, buffalo grass is highly tolerant to foot traffic. During establishment, traffic should be limited when possible.

Since all species selected in this restoration project are not shade tolerant, some arrangements had to be made to provide shade to campground users. To provide shade, hexagon shelters were constructed in each loop complete with picnic tables. Trees and shrubs were minimally used with two species present--bur oak (*Quercus macrocarpa*), which is a native oak with very thick bark capable of withstanding prairie fires, and grey dogwood (*Cornus racemosa*), which was considered an invader shrub on the prairie.

Buffalo grass seed averages $13.00 per pound. When comparing the actual costs to establish this species as a turf, the following figures were calculated. Desiring full sod cover in a single year requires seeding rates of 43 pounds per acre (1 pound per 1,000 square feet). This represents a seed cost of $560.00 per acre. In comparison, falcon tall fescue at $1.50 per pound seeded at 150 pounds per acre has an estimated seed cost of $225.00 per acre. Seed bed preparation costs will increase the actual costs of the fescue lawn. Buffalo grass needs no fertilizer to establish, and fertilizer is not required for maintenance. As with most native warm grasses, the use of fertilizer, unless perfectly timed, is detrimental due to absorption of nitrogen by undesirable weed species. Given the low maintenance costs associated with buffalo grass lawns, the ability to offset orig-

inal seeding costs can be accomplished in a single growing season.

Two benefits of this restoration which are difficult to quantify are the aesthetic and wildlife values. Providing visitors with a visual taste of Iowa's lost heritage, a landscape of tall grasses and brightly colored flowers truly offers a unique experience within central Iowa. Wildlife attracted to the development will not only find quality habitat, but will also provide enjoyment to visitors.

With the assistance of the "Field Guide for Low Maintenance Vegetation Establishment and Management" developed under the Natural Resources Research Program by the US Army Engineer Waterways Experiment Station, an aesthetically pleasing low-maintenance landscape is well under way to establishment. The long-term maintenance savings are expected to be substantial and the environment created will provide a unique experience to visitors camping or sight-seeing in the park.

Reference

Environmental Laboratory. 1986. "Field Guide for Low Maintenance Vegetation Establishment and Management," Instruction Report R-86-2, US Army Engineer Waterways Experiment Station, Vicksburg, MS.

Corps Training in Recreation Interpretation*

Deborah Chenoweth
US Army Corps of Engineers
Omaha, Nebraska 68101-0103

Steven Lee
US Army Corps of Engineers
Miami River Area
Waynesville, Ohio 45068

An opportunity for recreation interpretation

The US Army Corps of Engineers uses interpretation at almost all of its 450 lake projects, but until recently no structured interpretive training has been available within the Corps. The need for training is great because the park rangers and managers who deal with the public daily come from varied backgrounds such as park management, wildlife biology, law enforcement, or forestry and often have little or no training in interpretation. The Corps also does not yet have a strong positive image in an interpretive role such as the image associated with the National Park Service.

* This article was published in a slightly different form under the title "The Corps Interpretive Training Model," in the *1987 Interpreters Workshop Proceedings*. Since original publication of the article, the course has undergone minor revisions.

Interpretive Services Course

Recognizing this need, the Corps Natural Resource Management Office in Washington, DC, planned a three-day interpretive services course that would be offered to all Corps park managers and rangers throughout the United States. The course uses contract instructors and Corps personnel to teach employees with diverse backgrounds and needs to use interpretation in all aspects of their recreation and natural resource management programs. One of the major focal points of the course is to train Corps rangers and managers to view interpretation as a tool to accomplish their missions--not as a "frill" to be added when money and manpower allow.

The course has been held at various locations across the country, with an average class size of thirty. In 1986 and 1987 the firm Inside Outside was the successful bidder on the contract. In 1988, John Veverka and Associates conducted the course. The classes were held in January, February, and March so the class members could take back the information learned and use it to instruct temporary or seasonal employees hired for the summer recreation season. In addition to the three instructors provided by the contract, Corps personnel taught sections on the history of the Corps, the volunteer program, technical support available in the area of graphics and audiovisual production, and general policy and background from the Washington headquarters.

The purpose of the course is not to give class members a collection of specific techniques to use, but rather to teach them the necessary planning and managerial skills to develop an interpretive program that best meets the needs of their project, their visitors, and the Corps. Through proper planning, the students can use interpretive techniques to solve a myriad of recreation and resource problems, and give direction and purpose to the entire interpretive program.

Prior to the class all participants are sent a questionnaire and are asked to prepare a problem statement from their project, to work on in class. The first day a representative from the Washington office gives background on interpretation and the Corps. Then a comprehensive summary of the history of civil works is presented. Next the instructors give an overview of interpretation and agency objectives. Participants make short presentations to the entire class on their individual work problems, which helps to introduce the class to one another and to provide material to apply the course concepts. The remainder of the first day is spent covering how to gather a data base on resources and user groups.

The following morning each student presents his/her problem in detail to a small group, identifying the key management issues, analyzing the resource and users, and defining desired interpretive objectives. The group discusses the problem and generates a variety of approaches to the solution. The entire group then reconvenes and is presented the latest information on how to obtain and use high-quality posters, brochures, and audiovisual materials. The remainder of the day is spent on training techniques for personal and nonpersonal interpretation and the use of volunteers. The instructors help students realize the wide variety of methods available to them, examine the purposes and target audiences of each, and examine the benefits as well as drawbacks and costs. The students then gather again in their small groups and reexamine their problems to select themes, messages, and media. They develop a plan to produce, test, implement, and evaluate their final plan.

Student Workbook

The final day starts with the small groups meeting to hear the action plans developed by each student. A copy of every action plan is collected and sent to the Chief of the Natural Resource Management Branch in Washington so that he will be aware of the field problems. As a team, the instructors, both Corps and contractor, discuss the support network available from service organizations, professional societies, and the internal agency interpretation needed to operate effectively. The contracting procedures available to develop anything from an interpretive plan to a small exhibit to an entire visitor center are discussed in detail. The role of the project employee in providing background data and constant input into all phases of the contract is strongly emphasized. The final wrap-up is a challenge to pull together all that was learned in the class and use it with the action plans developed as the beginning of a planned interpretive management program.

All students are given a workbook with extensive supplementary information tabbed according to the class schedule subjects. The information is intended to be read at a later date and retained as reference material. The workbook includes a bibliography, sources of interpretive materials and equipment, copies of pertinent regulations, techni-

cal papers, and copies of all overheads used in the class. The material is designed so that it can be reproduced for use at the projects.

Training the Park Staff

At most Corps projects there is a need to train the seasonal staff hired each spring. This can be accomplished most effectively using a combination of a project orientation book, a short (2-3 day) training course held on the project, and on-the-job followup and evaluations. This three-phase program provides all employees with a common background of knowledge and permits each employee to continue to develop his or her skills throughout the recreation season.

The orientation book ideally is developed on the project and sent to each employee prior to starting work. It contains background information on the Corps and specific information on the project, including maps, brochures, and project data and procedures. An introduction to basic interpretation using information from the interpretive services course is included in the book along with a reading list.

Training Topics

When new employees report to work, a three-day training session can be held at a project with personnel from one or more projects. This provides all new staff with the necessary background to perform their work in a professional manner. Additionally, it helps them to understand the focus of the Corps and its missions. The course includes the following topics:

- Corps missions
- Customer care--communication with the public
- Orientation to the project and all lake operations
- Orientation to interpretive program
- Preview of programs and work
- Working the information desk and handling complaints
- Water safety
- Volunteers
- Principles of interpretation
- How to prepare programs
  - — Hikes and talks
  - — Roving interpretation
  - — Slide presentations
  - — School groups
- Corps and other agency cooperation

Even the best training course is ineffective without followup and evaluation. This can be accomplished through having each employee who will be dealing with the public make a presentation to their peers and supervisor with immediate constructive feedback. A formal checklist can be used to evaluate content and presentation techniques supplemented with general discussion. This allows an employee to polish his/her presentation skills *before* going out in front of the public and helps to overcome initial stage fright. The supervisor needs to periodically observe employees working with the public both at the front desk and making presentations. He/she can then give the employee suggestions on how to improve as well as reinforce the positive aspects of the employee's performance. In addition to regular informal feedback, a specific time should be set aside to give the employee a midyear review and an exit interview. Frequently employees are the best source of suggestions on how to improve the interpretive program and these reviews are a good time to ask for such feedback. The training program should be revised annually, incorporating the comments of the staff and the changing priorities of the agency.

The Corps of Engineers is trying to approach the management of its interpretive programs in a way that best serves the needs of the public and the agency. In order to accomplish this, careful planning and management of the program are vital to ensure that time and money are used in the most efficient and effective manner.

The first article describes the development of a low-maintenance prairie restoration at Saylorville Lake, Iowa. The campground, called Prairie Flower North campground, was developed using procedures outlined in "Field Guide for Low-Maintenance Vegetation Establishment and Management." The campground re-creates the tall grass prairies that once dominated Iowa. The second article describes Corps training in recreation interpretation. Since the Corps provides interpretation at nearly 450 lake projects, training in developing and carrrying out interpretation programs is much needed.

NATURAL RESOURCES RESEARCH PROGRAM

This bulletin is published in accordance with AR 310-2. It has been prepared and distributed as one of the information dissemination functions of the Environmental Laboratory of the Waterways Experiment Station. It is primarily intended to be a forum whereby information pertaining to and resulting from the Corps of Engineers' nationwide Natural Resources Research Program can be rapidly and widely disseminated to OCE and Division, District, and project offices as well as to other Federal agencies concerned with outdoor recreation. Local reproduction is authorized to satisfy additional requirements. Contributions of notes, news, reviews, or any other types of information are solicited from all sources and will be considered for publication so long as they are relevant to the theme of the Natural Resources Research Program, i.e., to improve the effectiveness and efficiency of the Corps in managing the natural resources while providing recreation opportunities at its water resources development projects. This bulletin will be issued on an irregular basis as dictated by the quantity and importance of information to be disseminated. The contents of this bulletin are not to be used for advertising, publication, or promotional purposes. Citation of trade names does not constitute an official endorsement or approval of the use of such commercial products. Communications are welcomed and should be addressed to the Environmental Laboratory, ATTN: J. L. Decell, U.S. Army Engineer Waterways Experiment Station, (CEWES-EP-L), PO Box 631, Vicksburg, MS 39181-0631, or call AC (601) 634-3494.

DWAYNE G. LEE
Colonel, Corps of Engineers
Commander and Director

DEPARTMENT OF THE ARMY
WATERWAYS EXPERIMENT STATION, CORPS OF ENGINEERS
PO BOX 631
VICKSBURG, MISSISSIPPI 39181-0631

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